

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 50.

July, 1948.

No. 595.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF
HARVARD UNIVERSITY—NO. CLXVII

STUDIES OF AMERICAN TYPES IN BRITISH
HERBARIA

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(Plates 1097–1117)

PART I. PREFATORY NOTES BY DR. SCHUBERT

In the early spring of 1945, when the work on the new edition of Gray's Manual had progressed to the point where only problems remained, Professor Fernald spoke occasionally of the necessity of having photographs of many of the type-specimens in British herbaria. In May of that year, shortly after V-E Day, he suggested that perhaps I could go to Britain when the war ended; and in August, during the two-day holiday proclaimed after V-J Day, he began to form a definite plan. In the winter of 1945–46, after being assured in correspondence with botanical colleagues at the British Museum (Natural History) and at Kew that their specimens might be returned from war-time sanctuaries and in working order by May, although other conditions might not be favorable, the likelihood of the project seemed less remote. The passage of three years since the beginning of preparations have now made the difficulties of the period from March, 1946, to the end of October, when I finally embarked on the Queen Elizabeth, seem much less enormous. A pleasant haze has settled over what seemed at the time very grim circumstances, surely not to be forgotten so soon. The really

outstanding recollection now is of the help very generously given us by friends¹ of the Gray Herbarium and by the members of the staff.

The strictly technical problems of camera and equipment had of necessity to be worked out in great detail because the possibility of buying anything at all abroad was not to be considered. With the aid and ingenuity of Dr. Ian D. Clement, then a graduate student very recently returned from service in Britain, this particular set of problems was worked out with sufficient care so that, with only minor modifications after arrival at the British Museum, the work was carried out as planned with no loss of negatives. The equipment, though simple, was designed with several considerations in mind, among them need for the least possible weight and probable lack of special lighting equipment and dark-room. We decided that the most portable case for carrying all the equipment would be a standard size student's laundry-case, which, after the camera, a Voigtlander Avus, $2\frac{1}{4} \times 3\frac{1}{4}$, was our first acquisition. With the inside measurements of the case at hand Dr. Clement proceeded to design a copying stand which could be used at one limit to photograph whole specimens (at $\frac{1}{5}$ natural size) and at the other to photograph details at natural size. Built in the University workshop, the extendable vertical rack was attached to the base by bolts and wing-nuts and the two portions of the rack were similarly joined, but the whole stand could be separated and packed with enough room left for film, film-holders, change-bag, notes, etc. The completely full case, with sufficient equipment for taking approximately one thousand specialized photographs (including all needs except lights), weighed 38 pounds, a not impossible load and one with sufficient padding in the form of "lab-coat" and kleenex to withstand the rigors of travel.

While the camera-stand was being constructed my occupations were many: trying to procure passage, finding film in quantity, copying descriptions of all the species to be studied and, in general, getting ready for a trip which might begin in May of 1946 or a year from then.

A passport was not received until late in June and then the

¹ Particularly the financial aid from Miss Edith Scamman, Mr. Walter D. Edmonds and Mr. Philip Wrenn.

vicious circle of "no visa, no passage; no passage, no visa" was run around for about two months until the British Consul, by this time probably a little tired of my frequent calls, said if all haste were made I could probably get passage on the Queen Elizabeth and if I did he would assume the responsibility of giving me a visa. Finally on the 28th of October, with too much luggage and a full sheaf of documents, I embarked on the beautifully refinished Cunarder in a state of complete exhaustion and great uncertainty. I do not know what I expected that distracted me to the point of leaving one piece of baggage in Customs at Southampton and the case with *all* my notes on the train at Waterloo Station (both of which, thanks to British efficiency, were very soon recovered) but my equilibrium returned promptly on reaching the British Museum in South Kensington.

The complete friendliness with which I was received by the Keeper of the Botany Department and his staff was very reassuring and the amount of help given me, particularly by Dr. George Taylor, immeasurable. For some weeks before my arrival Dr. Taylor, the Deputy Keeper, and his assistant, Mr. L. H. J. Williams, had worked from lists sent earlier, to get out a large number of the specimens I needed (since the Herbarium was not yet rearranged in actual working order). This meant a great saving in time and made it possible to start photographing immediately.

As Dr. Clement and I had expected, an unforeseen problem arose at once—the herbarium-sheets at the British Museum are considerably larger than the standard size in American herbaria. This required certain rearrangements but there was enough leeway in the rack so that the difficulty was satisfactorily overcome. The matter of lighting which had somewhat concerned us offered no particular problem and three (or sometimes only two) ordinary desk-lamps provided sufficient light.

During my six continuous weeks at the British Museum I took some 400 photographs of about 300 specimens in addition to the Walter Herbarium, photographed in its entirety and described in detail later in this paper. In the problems of photography particularly, Mr. James A. Crabbe of the technical staff was especially helpful and encouraging.

In many historical and bibliographical as well as taxonomic

questions Mr. A. H. G. Alston took particular pains to assist me. He also arranged a visit to the Chelsea Physic Garden, once in the charge of Philip Miller, many of whose types I was studying.

Both space and time prohibit my writing in any more detail of my stay at the British Museum. Although the larger amount of material needed was there, important types were also at Kew and in the middle of December I started working there, although, because of the acute housing shortage, I continued to live in South Kensington (on the tiny but well protected street on which Mr. Winston Churchill resides).

At Kew (where in contrast to the British Museum there was essentially no war-damage) I felt very much at home and it was obvious that the basic plans for the Gray Herbarium building were adapted from this splendid herbarium. The Keeper, Dr. Turrill, Mr. Sandwith in charge of American plants, Mr. Summerhayes in charge of *Orchidaceae*, and many others helped me to make rapid progress and do as much as possible in my limited time. The technical problems, solved in South Kensington, were no longer of any consequence. At Kew, in addition to studies of the North American types, it was also possible to photograph, though not study, types in many Central and South American genera in which my colleagues and I had special interest. In all I made just over 100 photographs at Kew and settled several bibliographical questions. Before Christmas too, I made a hurried trip to Cambridge to see some of Lindley's material (all preserved there but the *Orchidaceae*). Through the kindness of Dr. F. T. Brooks of the Botany School and the cordial assistance of Dr. J. G. Hawkes of the Imperial Institute of Genetics and Plant Breeding, my stay was made most interesting and profitable. A short visit with Mrs. Agnes Arber, who has done outstanding work, especially on the Monocots, was a very pleasant occasion in Cambridge too, planned for me by Mr. W. T. Stearn of the Royal Horticultural Society.

By the first of January, 1947, the period allotted for the project had passed but some summer vacation-time not used in 1946, made possible a short trip to Geneva and then a few days in London to study at the herbarium of the Linnean Society before departure.

My purpose in Geneva was chiefly to photograph DeCandolle's

types in *Begonia* and *Desmodium*, kept separately there, in the order of the Prodrusus. In a very short two weeks it was possible only to photograph the specimens (about 200), take very brief notes and make a firm resolve to return really to study more of the fascinating material and to become better acquainted with Geneva, a particularly interesting city historically (to say nothing of its very numerous wonderful book-shops). My stay in Geneva was made especially pleasant by the help of Dr. Baehni, Director of the Conservatoire et Jardin Botaniques, and the Secretary-librarian, Mlle. Nelly Dubugnon, who wrote innumerable notes in French, to ensure my not getting lost, and performed many other kind services. It was most interesting also to meet in Geneva Dr. Hochreutiner, former director of the Conservatoire, a most gracious gentleman, and Dr. J. C. Willis of "Age and Area" fame, then putting the final touches on a new work.

Returning to London in the last week of January, it was necessary to close off some unfinished bits at the British Museum, collect my negatives, which the officers of the Museum had kindly arranged to have developed for me, and to spend a few days at the Linnean Society of London. The devoted Assistant-Secretary of the Society, Mr. Spencer Savage, made working there a most interesting and stimulating experience, and the privilege of working on the herbarium as well as Linnaeus' own books, with his annotations, was a very great one.

My departure from London was made at the time of the beginning of one of the most severe winters there recorded. The low temperatures, plus the restrictions in use of electricity and fuel imposed soon thereafter, would have made photography impossible; so, although my time was all too short, an extension then would not have greatly helped.

It is quite impossible here to express adequately the real significance of this short journey to a few of the older, historical botanical collections abroad. Those who helped, here named and unnamed, both botanists and others of whom there were very many, have made a positive contribution to the accuracy and authenticity of the new edition of Gray's Manual. To all these friends this brief note is a small token of my appreciation and the gratitude of the senior author, Professor Fernald, and myself.

PART II. SOME LINNAEAN SPECIES (PLATES 1097-1102)

PTERIS ATROPURPUREA L. Sp. Pl. ii. 1076 (1753). The specimen so marked in the Linnaean Herbarium is the plant currently interpreted as that species. The first sentence in the Linnaean description might or might not refer to this plant. The Gronovian diagnosis seems to refer to *Pellaea glabella* Mett., but the Gronovian collection is not available. Since Linnaeus's specimen, annotated by him, is the pubescent plant, *P. atropurpurea* of authors generally, it is best not to disturb the present concept. Linnaeus's "stipes nitidus" does not hold for this plant.

POTAMOGETON PUSILLUS L. = *P. panormitanus* Bivona-Bernardi, var. *major* G. Fischer. As pointed out in RHODORA xlii. 246 (1940) Dandy and Taylor indicated (in Journ. Bot. lxxvi. 91 (1938)) that the TYPE of *Potamogeton pusillus* L. Sp. Pl. i. 127 (1753) has been regularly misinterpreted and that it is actually the later published *P. panormitanus* Biv. Nuove Piante ined. Barone Ant. Biv.-Bern. pub. del Figlio Andrea, 6 (1838). They did not make any differentiation between the two varieties of *P. panormitanus* which in America, at least, are very definite: var. *major* G. Fischer, Berichte Bayer. Bot. Gesells. xi. 109 (1907), and var. *minor* Biv. l. c. The former, with the larger or primary leaves 1-3 mm. wide, was illustrated in Fernald, Mem. Gray Herb. iii. pls. ix, xxix, fig. 7, xxxiii, fig. 4 and xxxix, fig. 10 (1932). The latter, with the larger leaves only 0.3-1 mm. wide and relatively short, was illustrated (Fernald l. c.) in plates x, xxix, fig. 8 and xxxiii, fig. 5. Until it could be determined which of these plants is matched by the Linnaean type of *P. pusillus* it was inadvisable to transfer either of the varietal names. It is now established that the TYPE of *P. pusillus* is identical with *P. panormitanus* var. *major*; this necessitates the new combination:

P. PUSILLUS L., var. **minor** (Biv.) comb. nov. *P. panormitanus* Biv. var. *minor* l. c.; Gussoni, Fl. Sic. Syn. i. 207 (1842); G. Fischer l. c.

ANDROPOGON ISCHAEMUM L. Sp. Pl. ii. 1047 (1753). The plant which Linnaeus labeled "11 Ischaemum" is *A. Gerardi* Vitm. (*A. provinciale* Lam. non Retz.), native in North America and cultivated and probably escaped in southern France. *A. Ischaemum*, as described and generally understood, is a wholly

different species, native to central and southeastern Europe, Asia and Africa and is the plant to which all the references cited by Linnaeus apply. The identity of *A. Gerardi* was discussed in RHODORA xlv. 255 et seq. (1943).

CYPERUS ALTERNIFOLIUS L. Mant. 28 (1767), "*Habitat in Virginia.*" Cited by C. B. Clarke in Journ. Linn. Soc. xxi. 130 (1884) in his paper *On Indian Species of Cyperus* with the range given as "Madagascar". There seems to be no question about the identity of the plant, which is not known in America.

JUNCUS NODOSUS L. Sp. Pl. ed. 2, 466 (1762). The material under this name is as mixed as were Linnaeus's bibliographical citations. The two specimens marked by Linnaeus as *J. nodosus* are (1) characteristic *J. scirpoides* Michx. (specimen no. 449.16) and (2) the little stoloniferous northern plant which regularly passes as *J. nodosus* (specimen no. 449.17). By some of the early authors *J. nodosus* was taken up in the sense of *J. scirpoides* and the latter cited as a synonym. Since, however, the brief diagnosis applies better to the second plant (no. 449.17), which for more than a century has been regularly treated as *J. nodosus*, it would be superfluous to interpret the species as intended primarily for *J. scirpoides*.

THE TYPE OF CELTIS OCCIDENTALIS L., OUR PLATES 1097, 1098.—*Celtis occidentalis*, one of the most variable and taxonomically difficult of species, was defined by Linnaeus, Sp. Pl. ii. 1044 (1753), as follows:

- occidentalis.* 3. CELTIS foliis oblique ovatis serratis acuminatis.
Celtis procera, foliis ovato-lanceolatis
serratis, fructu pullo. *Gron. virg.* 195.
Lotus arbor virginiana, fructu rubro. *Ray. hist.*
1917.
Habitat in Virginia. ♪
Folia tenera, ovato-lanceolata, parum pubescentia;
adulta lato-ovata, acuminata, acumine & basi
integerrima, ceterum serrata, nuda, nervoso-
venosa, latere postico duplo minore.

It will at once be noted that in the four-line new description by Linnaeus he obviously had two quite different plants confused: (1) "Folia tenera, ovato-lanceolata, parum pubescentia"; (2) "adulta lato-ovata, acuminata, acumine & basi integerrima, ceterum serrata, nuda, nervoso-venosa, latere postico duplo minore". Furthermore, the quotation from Ray said "fructu rubro"; that

from Gronovius, which obviously coincided with the first part of the longer Linnaean description with "foliis ovato-lanceolatis", had "fructu pullo".

Recent interpretation of *C. occidentalis* and its varieties started with Sargent in Bot. Gaz. lxxvii. 217, 218 (1919). There Sargent gave the following definitions.

CELTIS OCCIDENTALIS L.—"On what is usually considered the type of this species the leaves are broadly ovate, acute or short-acuminate at apex, obliquely rounded at base, coarsely or finely serrate, smooth on the upper surface, glabrous or sparingly pilose along the midribs and veins below, thin, not conspicuously venulose; petioles glabrous or rarely puberulous. The fruit is borne on glabrous or rarely puberulous pedicels much longer than the petioles and is subglobose, ellipsoidal, or slightly obovoid, and 9–10 mm. in diameter; the stone is only slightly reticulate. The branchlets are glabrous or occasionally pubescent."

Var. CANINA.—". . . Differing from the type in the usually narrower long-acuminate leaves.

"Extreme forms of this variety look very distinct, but trees with leaves intermediate between these and those of the typical form are common. The fruit varies as in the type from subglobose to obovoid, and there seems little difference in the length of the pedicels, which are always longer than the petioles. The leaves are usually glabrous, but on some of *Bush's* Missouri specimens the midribs and veins are pilose on the lower surface and the petioles are pubescent, as in the variety *crassifolia* . . ."

"Var. CRASSIFOLIA Gray, Man. ed. 2, 397. 1856.—*C. crassifolia* Lamarck, Encycl. Meth. 4: 138. 1797.—Differing from the type in its usually narrower, acuminate, thicker leaves, often more coarsely serrate or nearly entire, scabrate on the upper surface and pilose below along the midribs and veins.

"In this form the petioles are usually villose-pubescent, but occasionally are quite glabrous; the pedicels are slightly villose, and the branchlets are glabrous or pubescent."

At the same time Sargent took up for the tree of the southern Coastal Plain, which extends northward abundantly to the James River and inland northward in the Mississippi basin, the name *C. laevigata* Willd. of which, as Sargent said on his page 222,

"when it grows under favorable conditions, is a tree sometimes 30 m. high, with somewhat pendulous branches and slender, glabrous, red-brown branchlets. The leaves are thin, usually oblong-lanceolate, long-pointed and acuminate at apex, unsymmetrically rounded and often oblique or cuneate at base, frequently more or less falcate, entire or furnished with a few teeth usually toward the apex, green on both surfaces, glabrous, smooth or occasionally scabrate above. The fruit is bright orange-red on pedicels shorter or slightly longer than the petioles."

Sargent recognized (p. 223) *C. laevigata*, var. *Smallii* (Beadle)



CELTIS PROCERA, FOLIIS OVATO-LANCEOLATIS SERRATIS, FRUCTU PULLO of Gronovius, cited by Linnaeus as a secondary element of his *C. occidentalis*: FIG. 1, the Clayton (Gronovian) specimen, \times ca. $\frac{1}{2}$.

C. PUMILA Pursh: FIGS. 2 and 3, TYPE, \times $\frac{5}{7}$, courtesy of Messrs. Pennell and Long.

Sarg., in which the leaves of the fertile branchlets are constantly serrate, as well as some other variations of this often red-fruited species from farther to the southwest.

In his Manual (ed. 2) 318, 319 (1922), Sargent placed *C. occidentalis* with "fruit dark purple" under a heading "fruit on pedicels much longer than the petioles" and his fig. 289 thus illustrated it; while *C. laevigata* came under the general heading "fruit on pedicels shorter or only slightly longer than the petioles" the fruit being described as orange-color or yellow. The artist, however, showed the fruiting pedicels two or three times as long as the subtending petioles!

When the material which Linnaeus had before him is checked it is significant that the specimen, our PLATE 1097, FIG. 1, which he personally marked as species "3 K *C. occidentalis*", the specimen, collected by Kalm and now numbered in the Linnaean Herbarium 1209.4, has the fruiting pedicel scarcely as long as the petiole. This is the specimen which supplied the second portion of the Linnaean description, "*adulta lato-ovata*", etc. The citation from Ray with "fructu rubro" is not good for a species with purple-black fruit and may be passed as not typifying *C. occidentalis*.

The Gronovian account of "*Celtis procera, foliis ovato-lanceolatis serratis, fructu pullo*" is supported by a beautiful sheet in the Gronovian herbarium at the British Museum (our PLATE 1098, FIG. 1) which is clearly of *C. laevigata*, var. *Smallii*, a very characteristic tree which reaches its northern limit in Clayton's territory. This tree, with very thin oblong- or ovate-lanceolate, long-attenuate leaves, formed the basis of the first portion of the Linnaean description "*Folia tenera, ovato-lanceolata*". In the Linnaean Herbarium, but not bearing Linnaeus's identifications, there is a branch (1209.5) in anthesis (with one flower) the sheet bearing in Gronovius's hand "*Celtis fol. ovato-lanceolatis*", etc., but with the "fructu atro purpurascato subdulci". Since this specimen was not marked by Linnaeus and since most of its elongate leaves have the tips broken, it is of secondary importance, but the long-attenuate tips of the two unbroken upper leaves are readily matched by those of modern specimens of *C. laevigata*, var. *Smallii*. The Gronovian "fructu atro purpurascato" certainly was not deduced from the single

flower. At any rate, this specimen, without Linnaeus's identification, cannot be taken as the type of *Celtis occidentalis*. Since the one specimen which bears Linnaeus's identification and is certainly the basis of the description of the adult branch, while the far handsomer Clayton specimen of the tree "folia tenera, ovato-lanceolata" and the unidentified fragment in the Linnaean Herbarium are characteristic *C. laevigata*, var. *Smallii*, it seems only right to treat the first (1209.4) as the TYPE of *Celtis occidentalis*. This decision coincides with that of Mr. Savage in a letter to us, under date of 30 May, 1947, which refers unequivocally to "The type-specimen of *Celtis occidentalis* L. in Hb. Linn. no. 1209.4".

At the time the junior author made the photographs of *Celtis* in the Linnaean Herbarium the severe winter of 1946-47 was coming on in London and the resulting numbness of fingers made it impossible to ascertain clearly whether the leaves of 1209.4 were smooth or scabrous. This point is now settled for us in Mr. Savage's letter, written when the weather in London was "almost unbearably hot", Mr. Savage stating explicitly that "the leaves of this specimen are scabrous". The type of *Celtis occidentalis* is, then, as already surmised, identical with *C. crassifolia* Lam., *Encycl. Méth.* iv. 138 (1796), Lamarck's TYPE shown as our PLATE 1097, FIG. 2.

The thin- and smooth-leaved tree or shrub which has recently been passing as true *C. occidentalis* must be called *C. occidentalis*, var. *pumila* (Pursh) Gray, *Man.* ed. 2: 397 (1856), for this was based on *C. pumila* Pursh, *Fl. Am. Sept.* i. 200 (1814). This interpretation of *Celtis pumila* needs explanation, since, by the treatments of Sargent, Rehder and their followers, *C. pumila* is supposed to be the shrub or small tree of exposed or very bleak habitats with the leaves of the fertile branchlets entire or essentially so and the small and spherical fruits bright red or reddish to brown and with relatively small stones, whereas the fruit of the serrate-leaved and mostly taller *C. occidentalis* is larger, slightly longer than broad to spherical, and varying in the different trends from orange or amber-color to purple-black, the stones positively larger than in so-called *C. pumila*. The generally accepted but erroneous interpretation is well stated in the key and description in Rehder, *Man. Cult. Trees and Shrubs*, ed.

2: 184, 185 (1940). His *C. pumila* there comes under the first capital A of his key, "Leaves entire or occasionally with few teeth . . . : stone pitted", while *C. occidentalis* comes under AA "Leaves serrate". His *C. pumila* has its fruit described as "purple or tan-color". Deam's Flora of Indiana (1940), based upon a very close field-study of the plants of his region, thus separates *C. occidentalis* and the traditional *C. pumila*. In his key on page 392 the following is given for *C. occidentalis*:

Margins of leaves of fruiting branchlets and shoots sharply serrate all around to the base; leaf blades of an ovate to broadly ovate type, oblique at base, sometimes strongly so, those of fruiting branchlets 5-15 cm long; pedicels of fruit much longer than the petioles; nutlets 6-8 mm long; small or large trees.

This opposed to

Margins of leaves of fruiting branchlets usually entire, or some with a few teeth on one side or with a few teeth on both sides but never serrate on either side to the base; margins of leaves of vegetative branchlets and shoots similar to those of fruiting branchlets, or with the margins serrate nearly all around but never serrate to the base; pedicels of fruit shorter or only slightly longer than the petioles; nutlets 5-6 mm long,

this definition covering both *C. laevigata* and *C. pumila*. The latter is separated by Deam as follows:

Leaves mostly of an ovate-lanceolate type, sometimes ovate to broadly ovate or rarely oblong-lanceolate, generally thick and yellow green beneath, generally smooth but sometimes rough above; blades extremely variable in size and shape, mostly 3-10 cm long and 2-6 cm wide, usually about half the maximum size; branchlets usually more or less pubescent; pedicels shorter or longer than the petioles; mature fruit (collected in October) a dark cherry red; trees usually 1-2.5 m high, but sometimes 4-6 m high and up to 1 dm in diameter near the base; of a dry sandy, gravelly or rocky habitat.

Deam's very detailed description is of *C. pumila* as nowadays generally interpreted. Unfortunately, however, recent authors seem not to have paid very close attention to Pursh's own account. Otherwise they would not emphasize the entire leaves and the small and spherical purple or tan-color or cherry-red drupe. As a matter of fact, wherever the senior author has seen the entire-leaved so-called *C. pumila* its small spherical fruits have always been red to red-orange when ripe. Pursh's brief account was as follows:

pumila. 3. *C. foliis ovatis acuminatis aequaliter serratis basi inaequalibus utrinque glabriusculis: junioribus tantum pubescentibus, pedunculis subtrifloris, fructu solitario.*

On the banks of rivers: Maryland and Virginia. *h*.

May. *v. v.* A small straggling bush; berries ovate, black.

The small to medium-sized tree or shrub with relatively thin and smooth serrate leaves, which has passed as true *C. occidentalis*, is obviously what Pursh described. Fortunately Pursh's own material (the TYPE), with his own identification clearly written, is preserved in the Pursh herbarium at the Academy of Natural Sciences of Philadelphia. We are indebted to the generous interest of Mr. Bayard Long for a photograph of it, $\times \frac{5}{7}$ (PLATE 1098, FIGS. 2 and 3) and to Dr. Francis W. Pennell for a transcript of the label, Dr. Pennell remarking that Pursh's labels are the most complete of any on old collections preserved at the Academy. Pursh collected this specimen "in 1806 on his Virginia trip made for Dr. B. S. Barton".

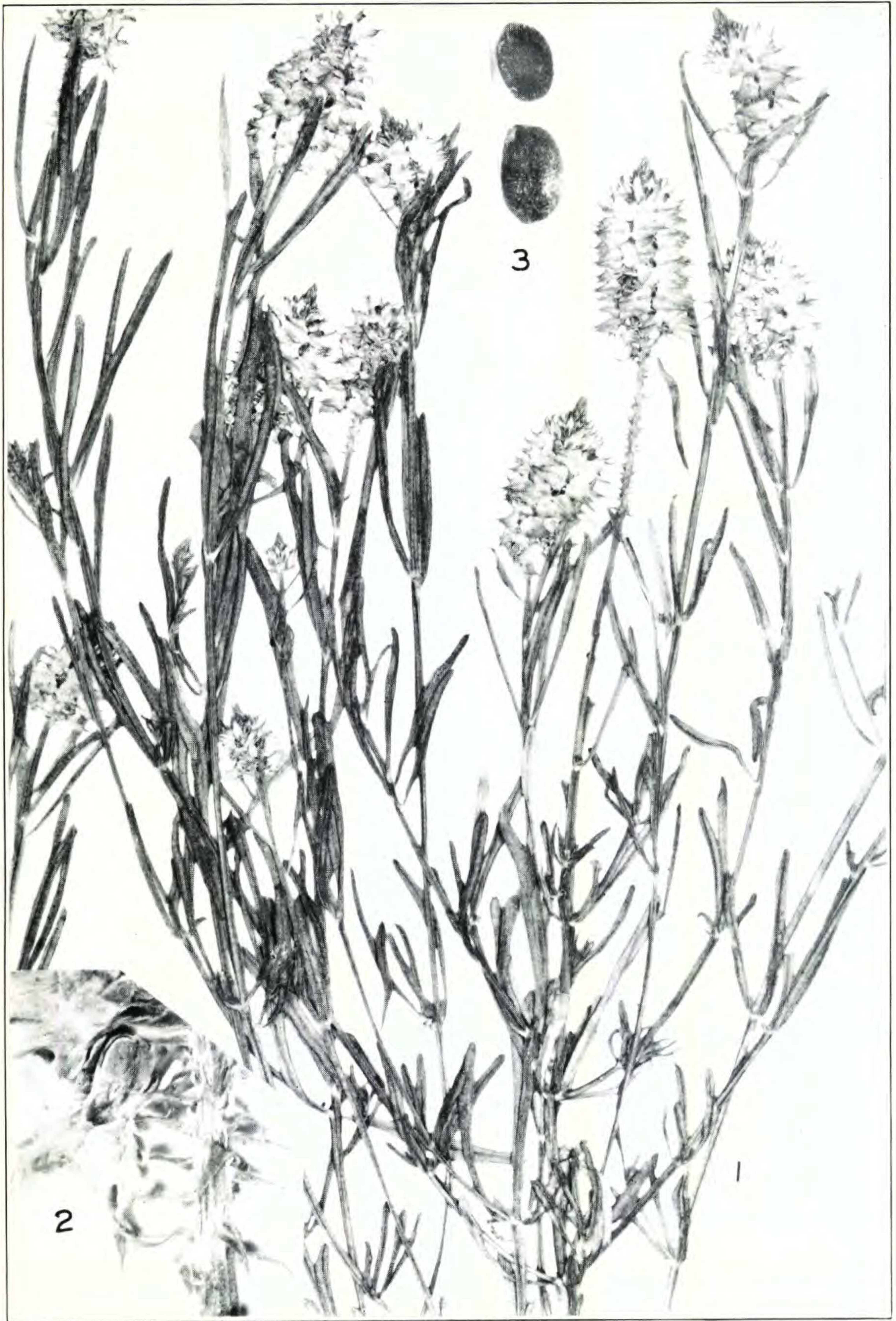
The shrub or small tree of usually exposed habitats which has erroneously been passing as *Celtis pumila* is *C. tenuifolia* Nutt. Gen. N. Am. Pl. i. 202 (1818). Although Nuttall thought his new species might be the *C. pumila* of Pursh, he definitely expressed doubt. His new name was not, then, a superfluous substitute but that of the shrub which erroneously passes as *C. pumila*. Here is Nuttall's description:

3. *tenuifolia*. *C. pumila*, Pursh 1. p. 200? A low bush, in the mountains of Virginia, flowering at the height of 2 feet. Leaves nearly as broad as long, now and then without serratures, often cordate-ovate, very little acuminate and almost perfectly smooth on both sides. Berries solitary, brown and glaucous.

The extreme with leaves thicker, more pubescent, and harshly scabrous above is:

C. TENUIFOLIA Nutt., var. **georgiana** (Small), comb. nov. *C. georgiana* Small in Bull, Torr. Bot. Cl. xxiv. 439 (1897). *C. pumila*, var. *georgiana* (Small) Sargent in Bot. Gaz. lxxvii. 227 (1919).

In some cases, as in the work of Deam, we find *Celtis pumila* ascribed to "(Muhl.) Pursh"; in others called *C. occidentalis*, var. *pumila* Muhl. The evident basis for such citations is the *nomen nudum* "*C. occidentalis*, B, *pumila* dwarf Pens. fl. Maio." of Muhl. Cat. 95 (1813). Without any differentiation, the word "dwarf" being a mere translation of "pumila", Muhlenberg's name must be treated as a *nomen nudum*.



POLYGALA CRUCIATA L.: FIG. 1, portion of plant, $\times 1$, from west of Snead's, Jackson Co., Florida, *Wiegand & Manning*, no. 1735; FIG. 2, portion of raceme, showing bracts, $\times 5$, from no. 1735; FIG. 3, seeds, $\times 10$, from Duval Co., Florida, *Curtiss*, no. 509.

Another name which may sometime have to be taken up is that of Persoon, Syn. i. 292 (1805), his *C. occidentalis* “ β .? *tenuifolia*, fol. tenuioribus minus acuminatis, dentib. majoribus basi magis rotundatis; vid. Enc. bot. l. c. p. 137 et 138. Cresc. in Ludoviscana; colitur in H. P. An distincta?”. This is based on *C. occidentalis* “ β . *eadem? foliis tenuioribus minùs acuminatis*” of Lam. Encycl. Méth. iv. 137 (1796). Lamarck further saying (p. 138):

L'arbre β , dont je ne connois ni les fleurs ni les fruits, est originaire de la Louisiane, & cultivé également au jardin des plantes. Il a les feuilles moins acuminées, plus minces, dentées plus grossièrement, un peu plus arondies à la bête. La gelée a d'ailleurs beaucoup de prise sur lui, & le fait ordinairement périr tous les ans jusqu' à la racine, au moins dans notre climat. N'est-il qu'une simple variété du *celtis occidentalis*, ou bien doit-il former une espèce particulière? (V. v. 5. Flor. & 5. Fr.)

It is not improbable that this variety may prove to be *C. laevigata* Willd., var. *Smallii* (Beadle) Sarg. l. c. 223 (1919). Until this matter is settled Sargent's varietal name should stand.

An early varietal name for typical *Celtis laevigata* Willd., the name to be taken up if entire-leaved typical *C. laevigata* is treated as a variety of *C. occidentalis* (a course for which there is logical argument, in view of the frequent overlapping of characters) is *C. occidentalis* L., var. *integrifolia* Nutt. Gen. i. 202 (1818). This varietal name was unjustifiably cited in the synonymy of *C. mississippiensis* Bosc ex Spach (1841) as “*C. integrifolia, Nutt.*” by Gray, Man. ed. 2: 397 (1856), thus unfortunately saddling upon Nuttall a binomial which he apparently did not make, Nuttall having used only the varietal combination. The only legitimately published *C. integrifolia* seems to be that of Lam. Encyc. Meth. iv. 140 (1796), with “*foliis ovato-subrotundis*” and coming from Senegal. Obviously this has nothing to do with *C. laevigata*, although *Index Kewensis*, with uncanny lack of understanding, refers it to the synonymy of the narrow-leaved American *C. mississippiensis* Bosc ex Spach (1841), a synonym of *C. laevigata* Willd. (1811). Even if the round-leaved *C. integrifolia* Lam. (1796) of Senegal were forced into the narrow-leaved *C. mississippiensis* of 1841 or *C. laevigata* of 1811 (reduced by Ind. Kew. to *C. mississippiensis*), it is not clear on what basis this indispensable but too often misleading work was com-

piled. *Celtis* was obviously as puzzling to its editors as to those who have to hunt for its morphological characters. Another name for entire-leaved typical *C. laevigata* Willd. (1811) is *C. longifolia* Nutt. N. Am. Sylva, i. 134, t. xl (1842), described in detail, beautifully illustrated and based on "*C. occidentalis* β . *integrifolia*, NUTT. Gen. Am. vol. 1. p. 202. (not of LAMARCK.)," Nuttall giving the tree a new name because of the earlier *C. integrifolia* Lam. (1796). Nuttall's *C. longifolia* has not made its way into Index Kewensis, presumably because it was thought to be the same as *C. longifolia* Raf. Atl. Journ. i. 177 (1833), a tree of "*Texas & Arkanzas*", which, from the description, "Fol. distichis, elongato oblongis acum. basi obliq. truncatis, equal. serratis" etc. was presumably *C. laevigata*, var. *Smallii*.

This discussion of nomenclatural and taxonomic problems is only typical of much which must be cleared before the exact names and identities of our plants (and especially the ligneous ones) can be finally settled. To the problem of evaluating the often fluctuating morphological characters is added the interpretation of authors of the past. The present authors do not deceive themselves into thinking that the problems of eastern American *Celtis* are finally settled. They may have done something to clear away some of the obstacles.

SALICORNIA VIRGINICA L. Sp. Pl. i. 4 (1753) as *virginia*. *S. herbacea*, β . *virginica* (L.) L. Sp. Pl. ed. 2: i. 5 (1762). *S. ambigua* Michx. Fl. Bor.-Am. i. 2 (1803).

Although Linnaeus confused the characteristic Atlantic North American perennial with a quite different plant of Europe, his brief diagnosis and his quoted description were both based on Virginian material from Clayton, described in Gronovius, Fl. Virg. ii. 129 (1743). The Gronovian account was clear and to the point:

SALICORNIA *caulium ramorumque articulis apice bicornibus*.
Salicornia erecta ramosa, caule ad imum nudo, plerumque rubente.
Clayt. n. 527 & 667.

Linnaeus wrote

virginia. 3. SALICORNIA articulis apice compressis emarginatis
bifidis.
Salicornia caulium ramorumque articulis apice
bicornibus. *Gron. virg. 129.*
Habitat in Virginia, & ad Salinas Saxoniae. ☉

In *Species Plantarum*, ed. 2, i. 5 (1762) Linnaeus corrected the spelling of the name but reduced the Virginian species to varietal rank under the annual *S. herbacea* L. as *S. herbacea* β . *virginica*, giving merely the description from Gronovius but adding the comment: “*Virginica* β . *ad Salinas Saxoniae frequentissima, vix ac ne vix distincta est species; articuli in salsis enim magis emarginati evadunt.*”

Even though Linnaeus confused the quite different plant of Saxony with the plant described by Gronovius from Clayton specimens and erroneously inferred that the Clayton specimens were annual, the collection of Clayton, preserved in the Gronovian Herbarium at the British Museum of Natural History, must stand as the TYPE of *Salicornia virginica*, especially since Linnaeus had no material in his own herbarium. This Clayton sheet, bearing the brief diagnoses above quoted from Gronovius and the nos. 572 and 667 (the former evidently misquoted by Gronovius as 527), consists of three branches, two of them forking from below the middle and with very prominent 2-horned scales (“caulium ramorumque articulis apice bicornibus”), the third a long and simple stem with few simple branches at summit (“erecta ramosa, caule ad imum nudo”). This material is very readily matched by specimens of *S. ambigua* Michx., a species which Clayton would have had great difficulty in avoiding along the coastal sands of Virginia.

POLYGALA CRUCIATA L., var. **aquilonia**, var. nov., TAB. 1100, planta 0.5–2.5 dm. alta, simplex vel divergenter ramosa; foliae verticillis primariis 3–5 (–7), foliis spathulatis vel spathulato-linearibus; racemis sessilibus vel breviter pedunculatis (pedunculo ad 5 mm. longo) primariis 0.7–1.5 cm. crassis; bracteis persistentibus 1.5–2 mm. longis; alae late deltoideo-cordatae, quam latis quam longis, 2.5–4 mm. longis in apice subulato, 0.5–1 mm. longo; seminibus ellipsoideo-obovoideis rugulosis.—Southern Maine to Virginia, there passing to typical *P. cruciata*; inland from northern Ohio to northern Illinois and Minnesota south to mountains of Alabama and Tennessee. TYPE from inner edge of salt-marsh, Stratford, Connecticut, August 30, 1896, *E. H. Eames* in Herb. Gray.

In general, botanists have interpreted the more northern var. *aquilonia* as true *Polygala cruciata*, and the wide-ranging southern *P. cuspidata* Hook. & Arn. in Hook. Journ. Bot. i. 194 (1834), not DC. (1824), has been treated as a fairly distinct and larger

variety, *P. cruciata*, var. *cuspidata* (Hook. & Arn.) Wood, Class-bk. ed. of 1861: 296 (1861) or var. *ramosior* Nash ex Robinson in Gray, Syn. Fl. i¹. 458 (1897). Small, furthermore, considered the latter a distinct species, *P. ramosior* (Nash) Small, Man. 771 (1933).

The Linnaean *Polygala cruciata*, Sp. Pl. 706 (1753), was based on two references, one of which, Gron. Virg. 80, contains a citation to a Clayton specimen, no. 157. This specimen, now in the British Museum, was examined and photographed. It consists of two depauperate plants with all the tendencies of the southern variety, although not quite approaching most such material in the size of its parts. Its leaves are linear-spatulate and its nodes numerous (for its size). On the same sheet with the Clayton collection is mounted a collection, also somewhat depauperate, from Maine. The latter plants show equally well the characteristics of var. *aquilonia*, with divergent branches and spatulate to narrowly oblanceolate leaves. The two collections could hardly be considered the same and better developed material makes clear that the tendencies here displayed, when fully developed, characterize real varieties. The Clayton material, immature though it is, unquestionably represents the more southern branch of the species, typical *P. cruciata*.

Although in eastern Virginia typical *Polygala cruciata* and var. *aquilonia* obviously merge, the material from Florida to eastern Texas, thence northward into eastern North Carolina (and largely eastern Virginia) seems to be well distinguished from the more northern series. The following characters may be noted:

P. CRUCIATA (typical), OUR PLATE 1099. *P. cuspidata* Hook. & Arn. in Hook. Journ. Bot. i. 194 (1834), not DC. (1824). Var. *cuspidata* (Hook. & Arn.) Wood, Class-bk., ed. of 1861: 296 (1861). Var. *ramosior* Nash ex Robinson in Gray, Syn. Fl. i¹. 458 (1897). *P. ramosior* (Nash) Small, Man. 771 (1933). Plant 1-5 dm. high, simple to much branched, the primary axis with 5-12 leaf-bearing nodes; leaves linear-spatulate or linear-oblanceolate, firm, the larger ones 1.5-3 (-4) mm. wide; racemes sessile or on peduncles up to 4 cm. long, the leading raceme before falling off of lower flowers (1-) 1.5-4.5 cm. long and 1.2-2 cm. thick; persistent bracts 2-3 mm. long; wings longer than broad, their blades 3.5-5.5 mm. long, tapering to an awn 1.5-3 mm. long; seed ellipsoid, faintly rugulose.

Var. *AQUILONIA*, PLATE 1100. Plant 0.5-2.5 dm. high, simple or divergently few-branched, the primary axis with 3-5 (-6) leaf-bearing nodes; leaves spatulate to narrowly oblanceolate, herbaceous, the larger ones (2-) 3-7 mm. wide; racemes sessile or on very short (up to 5 mm.) peduncles, the leading raceme before falling off of flowers 0.7-3.5 cm. long and 0.7-1.5 cm. thick; persistent bracts 1.5-2 mm. long; wings about as wide as long, 2.5-4 mm. long, with subulate tip 0.5-1 mm. long; seed ellipsoid-obovoid, coarsely rugulose.



POLYGALA CRUCIATA L., var. AQUILONIA Fernald & Schubert: FIG. 1, portion of TYPE-SHEET, $\times 1$; FIG. 2, portion of raceme, showing bracts, $\times 5$, from Centerville, Massachusetts, September 6, 1896, *E. F. Williams*; FIG. 3, seeds, $\times 10$, from Wellfleet, Massachusetts, *Fernald & Long*, no. 17,037.

True southern *Polygala cruciata* seems never to occur in sub-saline habitats but to prefer wet pineland or pine-barren or boggy savannas, Chapman, Fl. So. U. S. 84 (1860) assigning it to "Pine-barren swamps" and Small, Fl. to "Low pinelands and swamps". The 41 collections in the Gray Herbarium which have clear indication of habitat give the following score: moist pineland, pine-barren swamps or flat pineland, 14; savanna, sphagnous swale or sphagnous bog, 15; swamp, 3; meadow, 5; and moist soil, river-swamp, low ground and grass-palmetto land, 1 each. On the other hand the generally more northern or inland var. *aquilonia* is a plant of usually less saturatedly wet habitats and from Delaware northward it is partial to the outer coastal or coastwise region, even the upper borders of salt-marshes. Thus, in their report on the Flora of the Boston District, Knowlton and Deane recorded it in RHODORA xxi. 81 (1919) as "not reported from western towns, but occasional throughout the towns nearer the coast". In fact, of the 90 collections from Massachusetts before us the farthest inland is from Westford, only about 25 miles from the sea. Similarly, the Connecticut Botanical Society's Catalogue of the Flowering Plants and Ferns of Connecticut says: "Occasional or frequent near the coast, but rare or wanting inland". For the whole of New York state House could say only "In sandy swamps and depressions and the borders of salt marshes. Frequent or common on Long Island and Staten Island", not far inland. Again, Stone, reporting on the Plants of Southern New Jersey, says: "Common in damp ground in the Pine Barrens and locally in the Middle, Coast and Cape May districts, occurring at a few stations north of our limits, but all within the coastal plain". From the 70 collections before us from New England, which have the habitat clearly indicated, we get the following score: border of salt-marsh or sea-shore, 10; sandy, gravelly or peaty pond-margin, 31; meadow or low field, 13; cranberry-bog or boggy swale, 8; grassy swamp, damp sandy soil or sandy swamp, 2 each; dry field and damp woods, 1 each.

Farther inland (as in the case of many other coastwise species) var. *aquilonia* occurs near the Great Lakes, thence southward along the mountains to northern Alabama: swamps near Henderson, Henderson Co., North Carolina [between Blue Ridge and

Pisgah Ridge], *Biltmore Herb.* no. 731^d; Pine Knot, McCreary Co., Kentucky [Pine Mts. to Cumberland Plateau], *H. J. Rogers*, no. 39; 6 miles east of Crossville, alt. 2300 ft., Cumberland Co., Tennessee (Cumberland Mts.), *Svenson*, no. 4181; Sand Mountain, Jackson Co., Alabama, August 29, 1938, *Lillian V. Porter*. Extending locally inland from the Gulf States true *P. cruciata* reaches south-central Tennessee: Coffee Co., alt. 1100 ft., *Svenson*, no. 4258; Van Buren Co., *Svenson*, no. 9391; Grundy Co., *Svenson*, no. 8930.

From Blake's synonymy in the North American Flora it might be thought that *Polygala missurica* Raf. New Fl. iv. 89 (1838) should be taken up for the inland phase of *P. cruciata*, var. *aquilonia*; but it is probable that there was some misinterpretation of Rafinesque's plant. On his pp. 87 and 88 Rafinesque subdivided *Polygala* into 10 subgenera, with subgenus

"5. SEXILIA R. stamens 6 sessile, corolla bilabiate cristate, type *P. verticillata* and all whorled species, chiefly annuals".

His *P. missurica* was described as follows:

"966. POLYGALA (Sexilia) MISSURICA Raf. stem branched diffuse 4gone, leaves quaternate and opposite broad lanceolate smooth, base acute, end mucronate; spikes terminal oblong imbricate—in the prairies of Missouri and Illinois, 3 to 4 inches high, leaves larger and broader than in others, flowers white, not in filiform spikes. Annual".

Since subgenus *Sexilia* was typified by *Polygala verticillata* and the only additional species definitely named by Rafinesque in this place was his *P. missurica* with *lanceolate* (not *oblanceolate* nor *spatulate*) *leaves* and *white flowers* and since the ordinarily green- to bronze- or purple-flowered *P. cruciata* has never been recorded from Missouri (at least not recorded by Palmer & Steyermark), it would seem that Rafinesque was describing a white-flowered, lanceolate-leaved variety of *P. verticillata* with "spikes . . . oblong". Just such a plant is *P. verticillata*, var. *sphenostachya* Pennell in *Bartonia*, xiii. 9 and 12 (1931) which is represented by specimens before us from "sandy prairie", Havana, Illinois, *Gleason*; "sterile prairie", Stark Co., Illinois, *V. H. Chase*, no. 198; "prairies" Leeds, North Dakota, *Lunell*; "common on prairies", Black Hills, *Forwood*; and by material from Missouri. At least *P. missurica* can hardly be *P. cruciata*.

Ordinarily the racemes of var. *aquilonia* are greenish, reddish or purple-tinged. Very rarely an albino occurs. This is

Var. **AQUILONIA**, forma **alba** (Oakes), comb. nov. *P. cruciata* b. *alba* Oakes in Hovey's Mag. vii. 185 (1841).

HYPERICUM CALYGINUM L. Mant. 106 (1767). The habitat of this species was cited with doubt by Linnaeus as in *America septentrionali*. The species is, however, native in the Old World and the type-specimen is matched by a large amount of herbarium-material.

HYPERICUM PROLIFICUM L. l. c., our PLATE 1101, FIGS. 1-3. The material under this name in the Linnaean Herbarium was discussed in some detail by Svenson in *RHODORA*, xlii. 9 (1940). Svenson's decision that sheet no. 20 must be taken as the TYPE of *H. prolificum* L. is correct, as is his statement that sheets 22 (our FIG. 4), 23 and 24 represent *H. prolificum* in the sense of American authors generally, not Linnaeus (except in very small part, the Gronovian reference). In the original account Linnaeus included two very different plants:

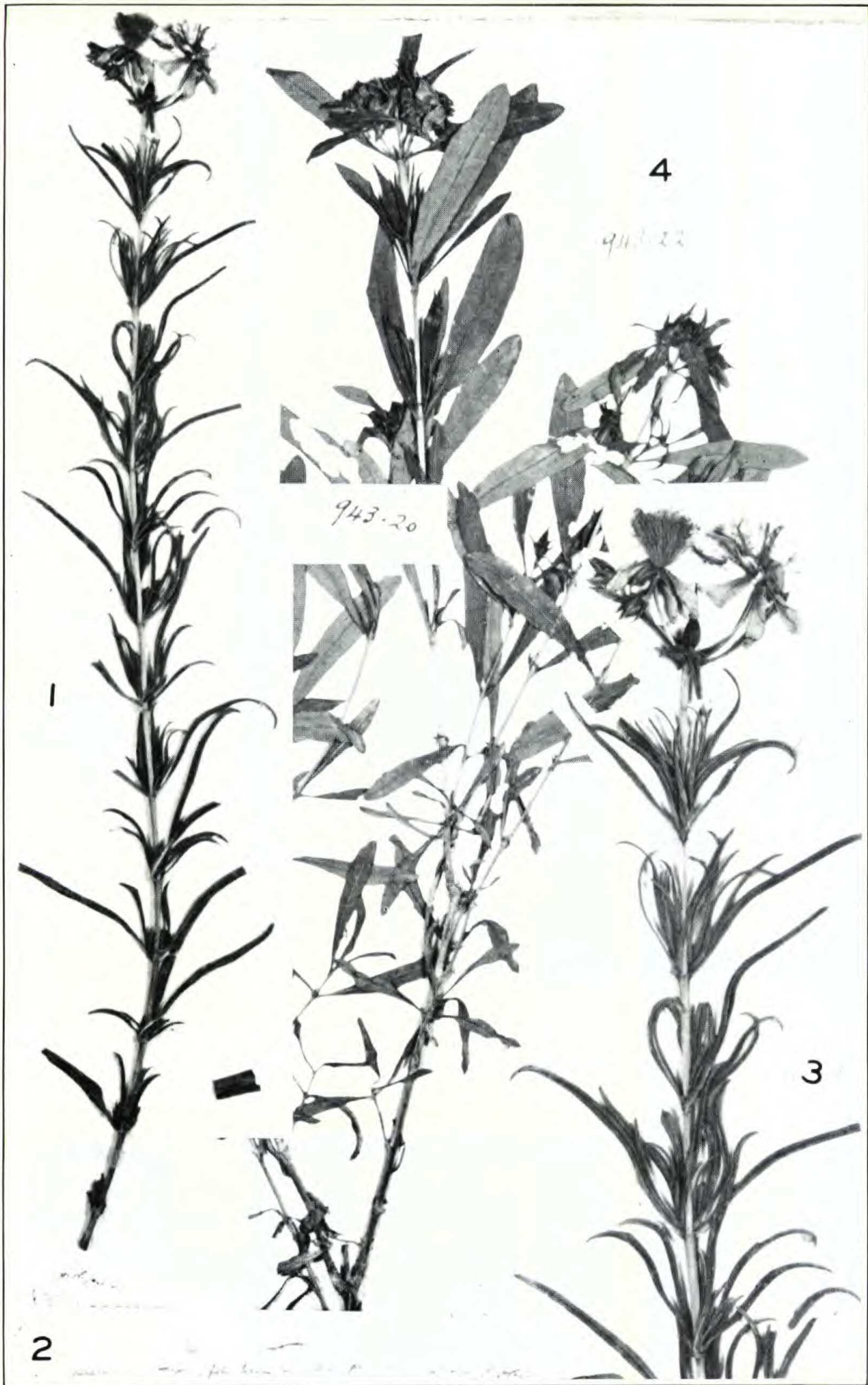
- proli- 31. **HYPERICUM** floribus trigynis, caule tetragono
cum. fruticoso, foliis lanceolato-linearibus, flori-
 bus primordialibus sessilibus.
Hypericum floribus semitrigynis, staminibus corol-
 la brevioribus, caule fruticoso semperuirente. *Gruan.*
 virg. 112.
Habitat in America septentrionali. b .
Caules recti, purpurascetes. Folia saepius
 reuoluta, vnde angusta Rosmarini. Foliola
 ramulorum primordia, ex alis plurima. Panicula
 parua, terminalis. Flores primae secundaeque
 dichotomiae sessiles; reliqui terminales,
 pedunculati, numero rarius ultra 7. Stamina
 petalis non longiora.

That the quotation from Gronovius (misprinted "*Gruan.*"), *Fl. Virg.* ed. 2: 112 (1762) and the further notes given by Gronovius referred to the plant familiarly known as *H. prolificum* (our FIG. 4) has already been noted by Gray and others. The difficulty is, that the plant described in detail (our FIGS. 1-3) "*Folia saepius reuoluta, vnde angusta Rosmarini. Foliola ramulorum primordia, ex alis plurima . . . Stamina petalis non longiora*", is the one which Linnaeus had in his herbarium as "*proliferum*" with an additional memorandum of some of the characters given in his description. His published specific name *prolificum* was, obviously, from the axillary fascicles ("*Foliola . . . ex alis plurima*").

The relationship of sheet no. 20 seems, from examination of the inflorescence and the comparative length of stamens and petals to be, as Svenson indicated, possibly with what we have considered true *H. prolificum* rather than with *H. densiflorum*. The extreme variation in leaf-characters, however, seems to us to indicate a differentiation more basic than the mere aberrancy from *H. prolificum* which Svenson considers it. In the vast amount of herbarium-material available we have not been able to find anything which can be identified unquestionably with the Linnaean sheet number 20. The only name which we have found in the literature which is possibly applicable to *H. prolificum* sensu Gray, Man. (and current authors) is *H. SPATHULATUM* (Spach) Steud. Nomencl. ed. 2, i. 789 (1840), based on *Myriandra spathulata* Spach, Hist. Nat. Vég. v. 440 (1836)¹. Spach's description was detailed and he cited as its basis material at Paris received from Leconte as *H. prolificum*. Asa Gray, looking up the Spach type, made the unpublished memorandum that it was *H. prolificum* (in his sense). This name of course invalidates *H. spathulatum* Keller in Engler, Bot. Jahrb. lviii. 195 (1923), based on one of Harper's numbers from Georgia which we have not seen.

FRAXINUS AMERICANA L. Sp. Pl. ii. 1057 (1753), as pointed out by the senior author in Journ. Arn. Arb. xxvii. 390, 391 (1946), was based by Linnaeus primarily on the Gronovian account and Catesby's plate. The Catesby plant is clearly of the southern Water Ash, *Fraxinus caroliniana* Mill. (1768) and the quotation from Gronovius was altered by the addition of "petiolis teretibus", a phrase which Gronovius did not use. Since the latter character is a distinctive one of the Water Ash and not of the White Ash, universally known as *F. americana*, it was naturally inferred that the Clayton specimen cited by Gronovius was of the same species as Catesby's. It was, however, pointed out that Linnaeus had in his own herbarium as *F. americana* a

¹ Unfortunately *Index Kewensis* cites *Myriandra spathulata* and other species fully described by Spach in his extended treatment of the *Hypericaceae* in his *Histoire Naturelle des Végétaux*, vol. 5 (June, 1836) as published only in *Annales des Sciences Naturelles*, Sér. 2, v. (June, 1836), a mere summary of the more extended monograph then being printed. In the briefer summary most of the species appear only as names, with reference to Spach's forthcoming "*Suites à Buffon*", the latter name used for Spach's series of monographs published in his *Histoire Naturelle des Végétaux* (see Pritzel, *Thesaurus*, entry 8805). The publication of most of the species should date from the latter work.



HYPERICUM PROLIFICUM L.: FIGS. 1-3, TYPE; FIG. 1, plant, $\times \frac{1}{2}$; FIG. 2, portion of description (quoted by Svenson), $\times \frac{1}{2}$; FIG. 3, summit of plant, $\times \frac{4}{5}$.

H. SPATHULATUM (Spach) Steud. = *H. prolificum*, in part, of L. and sensu most authors: FIG. 4, a specimen, $\times \frac{1}{2}$, in the Linnaean Herbarium.

mature leaf of characteristic White Ash. The argument was used that only by accepting this specimen as the type could the name *F. americana* be retained in its long-established sense. It now proves, happily, that the Clayton sheet, described by Gronovius, consists of a very young branchlet of undeveloped leaves and a mature leaf of perfectly typical *F. americana*, the leaflets rounded at base and definitely whitened beneath. This mature leaf is so like the leaf in the Linnaean Herbarium that it is difficult to believe that the two were from different branchlets. The ground for maintaining *F. americana* in its traditional sense is thus vastly strengthened.

CHELONE GLABRA L. Sp. Pl. ii. 611 (1753). The uppermost leaves on the type-specimen are not measurably reduced in size as implied in Pennell's key (Scrophulariaceae of E. Temp. N. Am. 187 (1935)). Although there is some variation in leaf-size in the large number of specimens in the Gray Herbarium some modification in the key, which allows for no variation, is necessary.

CASSINE PERAGUA L.—In 1900 Loesener¹ discussed in some detail the status of the name *Cassine* L. and reviewed Linnaeus's disposition of *C. Peragua* through several of his works. He concluded that *C. Peragua* is a *nomen nudum*. Obviously, he has confused his terms, because the name was perfectly validly published. It is, however, an outstanding example of a *nomen ambiguum* as well as of a *nomen confusum*!

In the Linnaean Herbarium there are two specimens of American shrubs under the name *Cassine Peragua*. One of them (numbered 380.2) bears the name "Peragua" in Linnaeus's hand as well as an inscription by Sir James Edward Smith: "Viburnum cassinoides HB. diversum a V. cassia. HL. Viburnum laevigatum. Ait. Willd. Sp. Pl. v. 1. 1492". This plant is a vigorous sprout with narrowly elliptic and acuminate leaves, those of the leading shoot abundantly crenate-dentate. It is easily matched by narrow-leaved specimens of *Viburnum cassinoides* L.

The second specimen (numbered 380.3 and pinned to 380.2), also marked "Peragua" by Linnaeus, is a characteristic sterile shoot with obovate, remotely dentate leaves of *Viburnum obovatum* Walt. Fl. Carol. 116 (1788). This identification has

¹ Loesener in Engl. Bot. Jahrb. xxviii². 154, 155 [footnote] (1900); and in Monog. Aquifol. in Nov. Act. Abh. der Kaiserl. Leop.-Carol. Deutschen. Akad. Naturf. lxxviii. 496 (1901).

been many times noted in the literature and there seems no good reason to doubt it; particularly since the Linnaean specimen can be well matched by a small specimen of leaves and flowers in Walter's Herbarium which agrees well with his description of *V. obovatum*, although labeled simply "Viburnum".

As Loesener showed, Linnaeus's own concept of *Cassine Peragua* was not clear. First mention of the plant by Linnaeus was in his *Materia Medica*, 50 [genus no. 153] (1749) where, under *Cassine* of Hort. Cliff. 72 he took up

CASSINE vera perquam similis arbuscula, phillyreae
 foliis antagonistis. *Pluk. mant.* 40. t. 371. f. 3?
 Loc: Aethiopia, Carolina. *Arbor mansveta*
 PHARM: PERAGUAE Folia.

In *Species Plantarum*, ed. 1, Linnaeus cited his Hort. Cliff. and *Materia Medica* references among many others, all of which referred to an Old World plant, giving again however, the "Habitat in *Aethiopia, Carolina. b*".

In ed. 2 of *Species Plantarum* one reference of ed. 1 was removed, another reference was added and the habitat altered to read "*Habitat in Aethiopia. b.*". Also, in ed. 2 a new *Viburnum*, *V. cassinoides* was described with one of the citations being "*Mill. dict. t. 83. f. 1.*". In the *Mantissa Altera* the reference newly added to *Cassine Peragua* in Sp. Pl. ed. 2 was transferred to *C. capensis*; the Miller reference given under *Viburnum cassinoides* of ed. 2 was placed here under *C. Peragua* and the habitat revised to read "*Habitat in Carolina, Virginia. b.*". Also, an additional diagnosis was appended:

Folia petiolata, lato-lanceolata, acutiuscula, serrata
absque venis elevatis.
Petioli dorso decurrentes, unde Ramuli ancipites.
Corymbi breves.
Obs. caute distinguenda a C. capensi.

The new diagnosis as well as the reference to the Miller plate seem to be based on the narrow-leaved form of *V. cassinoides* to which we are referring specimen 380.2 of Linnaeus. Although specimen 380.3 is *Viburnum obovatum*, it is clear that Linnaeus did not describe that species as his *C. Peragua*, but rather *V. cassinoides* which he had already defined under *Viburnum*.

Since the taxonomic elements of Linnaeus's *Cassine Peragua* can be disposed of by placing them in species of *Viburnum* under relatively well understood names, it would seem soundest policy to reject the name *Cassine Peragua* permanently rather than to apply it in still another sense and further increase the confusion.

RUDBECKIA LACINIATA L. Sp. Pl. ii. 906 (1753) occurs as four fairly well defined geographic varieties. True *R. laciniata* (photograph of the TYPE before us) is very coarse, up to 3 m. high, with soon reflexed ligules 2–6 cm. long; the greenish-yellow disk at first hemispherical but soon columnar and elongated to 1.5–3 cm. and becoming 1.3–2.5 cm. broad; achenes 5–6 mm. long. Its lower leaves are petioled and pinnate, with 5–7 incised or 3-lobed leaflets, the median and upper similar but sessile, the uppermost often simple. This coarse species extends from Quebec to Montana, south to Nova Scotia, New England, northern Florida, Louisiana, Texas, New Mexico and Arizona, including *R. ampla* Nels. in Bull. Torr. Bot. Cl. xxviii. 234 (1901).

In the southeastern United States most *Rudbeckia laciniata* is lower, 0.7–1.5 m. high, and more slender, with disks only 0.7–1.3 cm. thick and elongating only to 0.7–1.5 cm.; the ligules 1.5–3.5 cm. long; and achenes 3.5–5 mm. long. This southeastern series consists of three well defined varieties. The commonest, var. *DIGITATA* (Mill.) Fiori in Fiori & Paoletti, Fl. Anal. Ital. iii. 300 (1904), based on *R. digitata* [as *digitatis*] Mill. Gard. Dict. ed. 8, no. 6 (1768), is smooth or with the thin leaves merely scabrous, the basal and lower cauline leaves with their pinnae cut into narrowly lanceolate to almost linear segments. This variety occurs from eastern Maryland to Georgia. A photograph of the TYPE of *R. digitata* Mill., secured by the junior author, is thoroughly characteristic of the variety as here interpreted.

Var. *HUMILIS* Gray, Syn. Fl. N. Am. i². 262 (1884), is quite as slender and low as var. *digitata*, with some, usually all, the thin lower leaves ovate and unclleft or but slightly cleft into 1 or 2 pairs of broad undivided segments or leaflets, its upper leaves mostly simple and ovate or ovate-elliptic and petioled. Described as growing on "Alleghany Mountains from Virginia to Georgia and Tennessee, common in open woods, &c., at 4,000 to 6,000 feet", it has an isolated station on the Peninsula of Virginia:

floodplain of wooded swamp, near Mill Creek, 3½ miles southwest of Williamsburg, *Grimes*, no. 4600, in an area where many other montane plants are isolated; and it is also found in the mountains of Kentucky: near Poor Fork Post Office, Harlan Co., *Kearney*, no. 324.

The fourth variety is the cinereous plant of Florida, with leaves densely soft-pilose beneath, described as *R. heterophylla* Torr. & Gray, Fl. N. Am. ii. 312 (1842). In everything but its dense and short pubescence and firmer leaves it closely resembles var. *humilis*. Neither Gray, Syn. Fl., nor Small gave any characters, except the pubescence, to separate it and we can find none. The TYPE-series has simple cordate-ovate basal leaves with coarse dentation, in outline quite as in most typical var. *humilis*. Var. *heterophylla* seems to be confined to Florida, south of the slightly more northern and chiefly montane var. *humilis*. We are calling it

R. LACINIATA L., var. **heterophylla** (Torr. & Gray), stat. nov. *R. heterophylla* Torr. & Gray, Fl. N. Am. ii. 312 (1842).

THE TYPE OF *RUDBECKIA HIRTA* (PLATE 1102).—*Rudbeckia hirta* L. Sp. Pl. ii. 907 (1753), his species no. 3, rested in part on references to earlier authors, in part upon material actually before Linnaeus while preparing *Species Plantarum*. The treatment was as follows:

3. *RUDBECKIA* foliis indivisis spatulato-ovatis, radii *hirta* petalis emarginatis.
Rudbeckia, ramis indivisis unifloris, foliis ovato-lanceolatis, *hirta*. *Büttn. cunon.* 227.*
Rudbeckia foliis lanceolato-ovatis alternis indivisis, petalis radii integris. *Gron. virg.* 181.
Obeliscotheca integrifolia, radio aureo, umboae atrorubente. *Dill. elth.* 295. t. 218. f. 285.
Chrysanthemum helenii folio, umbone floris gradiusculo prominente. *Pluk. alm.* 99. t. 242. f. 2. *Moris. hist.* 3. p. 23. *Raj. suppl.* 210.
Habitat in Virginia, Canada. ♂. 2

Two of the older references were to illustrations, but certainly Plukenet's figure is not of the same plant as that well illustrated and described by Dillenius, whose plate and description have been generally accepted as the standard, at least, of true *R. hirta*. Thus, in the Synoptical Flora, i². 260 (1884), Gray's first citation for *R. hirta* read: "Spec. ii. 907 (Dill. Elth. t. 218)".